RCS
ADVANCING SURGICAL STANDARDS

CORESS is a confidential reporting system for surgery. The purpose of CORESS is to promote safety in surgical practice, both within the NHS and in the independent sector.

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coress feedback

This issue of CORESS Feedback has cases from disparate surgical specialties but with generic themes. Several of the cases illustrate cooperation with other organisations concerned with surgical safety: NHS England, the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) and the Medicines and Healthcare products Regulatory Agency. Sharing and dissemination of knowledge of adverse events underpins the surgical profession's determination to improve safety for our patients.

We are grateful to the clinicians who have provided the material for these reports. The online reporting form is on our website (www.coress.org.uk), which also includes all previous Feedback reports. Published contributions will be acknowledged by a 'Certificate of Contribution', which may be included in the contributor's record of continuing professional development.

'Swiss cheese' effect (Ref 152)

I was called to assist an otolaryngology registrar undertaking a solo list while his consultant was on leave. The consultant had created a cerebrospinal fluid fistula during elective sinus surgery. I reviewed the preoperative computed tomography (CT) before scrubbing and found that the imaging showed no evidence of sinus disease. The fistula was repaired intraoperatively and the patient made an uneventful recovery after spending two nights more in hospital than planned.

On investigation as to how the patient had been listed for surgery in the absence of sinus disease on CT, it became apparent that a different registrar had listed the patient (whose complaint was of postnasal drip) for surgery on the grounds of a radiology report that stated that there was extensive disease. It appears that a radiology transcription error had occurred, which was overlooked as the CT had not been reviewed in the clinic. Furthermore, as the history did not support a diagnosis of chronic sinusitis, the CT should not have been requested. The patient underwent unnecessary surgery, resulting in a major complication, with no symptomatic benefit. He has declined the offer of further treatment.

CORESS comments

This case represents a 'never event'* in which a number of circumstances contributed to the adverse outcome – the classical 'Swiss cheese' effect. An initial incorrect clinical diagnosis was made despite the patient's symptoms; there was failure to follow Royal College of Radiologists guidelines in requesting CT at the first visit when the only symptom was that of postnasal drip; a transcription error occurred in the radiology department; the patient was listed for surgery by a surgeon who did not have final responsibility for the operative procedure, on the basis of the incorrect radiology report (in the last issue of Feedback, CORESS drew attention to the perils of pooled lists); and the CT was not reviewed prior to surgery by the operating surgeon (as recommended in the World Health Organization [WHO] checklist). The importance of the operating surgeon checking all of the patient's relevant investigations prior to anaesthetic induction cannot be overemphasised.

*NHS England's 2014 surgical never events taskforce report can be downloaded at: http://www.england.nhs.uk/ourwork/patientsafety/never-events/surgical/

Systematic delays result in adverse outcome (Ref 154)

A 68-year-old man presented to the emergency department at 8pm with an obstructed paraumbilical hernia. Resuscitation was undertaken and he was listed for surgery during the afternoon of the following day because the on-call surgeon was undertaking an elective operating list in the morning. During the afternoon, the operation was postponed until the evening owing to the need for extracorporeal membrane oxygenation (ECMO), for concomitant respiratory disease. During the evening hours, a new on-call surgeon thought that the patient was now in renal failure, with no urinary output, and transferred him to the high dependency unit for further resuscitation, listing him for surgery the next morning.

I was the on-call surgeon the following morning and reviewed the patient, finding him to be in renal failure requiring inotropic support. Although he had metabolic acidosis, black areas had now appeared in his skin overlying the hernia. He was transferred to theatre for a laparotomy.

Prior to the surgical procedure, the patient had three cardiac arrests, from which he was revived. At laparotomy, ischaemic perforated bowel with faecal peritonitis was found in a large hernia sac. The small bowel was resected, and an ileostomy and mucus fistula was created. He remained septic, anuric and died several hours later.

Reporter's comments

There was a delay in recognition of ischaemic bowel and cancellation of the original surgery as a result of ECMO. The on-call surgeon was not available on the morning after the patient's admission because he had not cancelled his elective list.

CORESS comments

This case provides several lessons. An obstructed, potentially strangulated hernia is a clinical indication for urgent surgical intervention. While fluid resuscitation is important, intervention for the underlying cause of the patient's problems should not be delayed. In the current surgical climate, the CORESS Advisory Committee recommended that an 'on-call' surgeon should drop all routine elective commitments during the period of being on call and should be available to respond to emergencies promptly. This should be agreed as a governance principle with trust management. The risks posed by a shift system in which no one takes ownership for a patient are evident. A named consultant should take responsibility for the patient. Handovers should be comprehensive and should draw attention to clinical problems requiring urgent attention.

The first report of the National Emergency Laparotomy Audit, commissioned by the Healthcare Quality Improvement Partnership, and funded by NHS England and the Welsh Government can be found at http://www.nela.org.uk/. The following recommendations for patients requiring emergency laparotomy are made:

- timely review by a senior surgeon following admission
- formal assessment of risk of death
- defined pathway of perioperative care
- prompt administration of antibiotics
- ready availability of diagnostic investigations
- prompt access to an operating theatre
- surgery performed under direct care of a consultant surgeon and consultant anaesthetist
- admission of high risk patients to a critical care unit following surgery

Structured handover of care is required at all times by all clinicians treating emergency laparotomy patients.

Opaque perspective (Ref 174)

Carrying out a laparoscopic cholecystectomy, after initial introduction of the laparoscope, the instrument was withdrawn, cleaned on an antifogging sponge and reinserted. The view was completely obscured and direct inspection of the scope revealed opacification of the lens, apparently within the instrument. A replacement scope was checked by myself (as the first had been), by direct vision, prepared with the antifog solution on the sponge and inserted into the abdomen. Again, the view was completely obscured. It was then that the scrub nurse realised that the solution placed on the sponge was not antifog solution but wound glue for the end of the procedure. The laparoscopes were 'repaired' by thorough cleaning but this took some time. No harm came to the patient but had this happened at a critical stage, the outcome could have been different.

Reporter's comments

Both the antifog solution and the tissue glue were contained in similar bottles with 'twist off' caps. The bottles were opened in a theatre environment in which the lights were dimmed.

CORESS comments

It should be policy to check all solutions for use, either in a patient or on equipment that will come into contact with the patient, while the lights are 'up', prior to the procedure. It is the responsibility of the operating surgeon to reassure himself or herself that any fluid potentially coming into contact with the patient is being used appropriately, is of the correct dose and is not time expired. Where evident similarities in packaging of different substances used in the same context occurs, the procurement team and the manufacturers should be informed.

Failure to check image guidance system preoperatively (Ref 175)

A 72-year-old patient presented to the emergency department following a generalised tonicclonic seizure, with a temporary postictal left-sided hemiparesis. Magnetic resonance imaging revealed a 2cm lesion with a cystic appearance in the right frontal lobe. CT failed to reveal an overt extracranial primary malignancy and serum inflammatory markers were normal. Differential diagnoses included solitary metastasis and brain abscess.

Urgent biopsy using image guidance was sought to make a diagnosis. During anaesthetic induction, an attempt was made to load the preoperative images on to the image guidance system. As well as a 'disk error' message, the system displayed other error messages such that three further disks loaded with the preoperative images were obtained from the imaging department. At this point, an older image guidance system was found to function properly with the existing disks and the operation went ahead as planned. Macroscopically, the biopsy consisted of pus and a smear revealed numerous leucocytes. Delay in obtaining functional image guidance meant that 65 minutes elapsed between the patient being ready for surgery after intubation and knife-to-skin time. The patient made a good postoperative recovery with no adverse effects.

Reporter's comments

The patient was anaesthetised before ensuring that essential equipment was functioning. The WHO checklist undertaken during the 'time-out' asks the surgeon to check that essential imaging is displayed before skin incision and whether any specific equipment requirements exist. However, essential equipment, including imaging kit, should be checked to ensure it is fully operational prior to induction. An ideal time to do this would be at the start of an operating list (as part of a team briefing) so that alternative equipment may be obtained or a decision can be made as to whether to proceed if a fault is discovered.

Images should be preloaded on to image guidance systems prior to induction of anaesthesia as disk incompatibility problems are not infrequent. Where equipment is essential to perform a procedure, backup kit should be available in case of technical failure. When using new or unfamiliar equipment, the surgeon must be confident that he or she can operate it correctly, or the surgeon ensure

that adequate mentorship is available from colleagues or medical device company representatives. Surgeons should always have a back-up plan in the event of operative difficulties.

CORESS comments

The CORESS Advisory Committee agreed with the reporter's comments with respect to checking functionality of essential equipment prior to induction. All relevant imaging should also be checked before inducing the patient, as demonstrated in another case in this issue of Feedback. In cases of overt equipment failure, this should be reported to the manufacturer as a matter of course.

Tracheostomy trouble (Ref 169)

A 50-year-old acutely unwell male patient underwent a laparotomy and small bowel resection for obstruction. Following surgery, he was admitted to the intensive care unit, where he remained intubated and ventilated. His progress was complicated by a spontaneous pneumothorax, requiring chest drainage, and owing to prolonged intubation, a tracheostomy was undertaken to facilitate suction and respiratory care. He was improving gradually and had been discharged to ward care, when he suddenly succumbed to a cardiorespiratory arrest in the early morning.

Postmortem examination revealed that the cardiorespiratory arrest had been due to obstruction of the tracheostomy by a mucous plug. Ward night staff had not been trained with respect to tracheostomy management and had failed to notice the patient's deterioration.

CORESS comments

Expert ENT opinion was obtained. Sadly, death from mucus plugging of tracheostomy tubes is an avoidable but recurring event. Tracheostomised patients may be admitted under any surgical specialty and it is therefore essential that all staff dealing with such patients are aware of best practice.

- All healthcare professionals dealing with tracheostomised patients must have adequate training in tracheostomy care and resuscitation needs.
- Hospitals should have a standardised local policy for care and a multidisciplinary tracheostomy team where possible.
- Patients should have a double lumen tube to allow easy changes in cases of mucus plugging.
- A spare inner tube, tracheal dilators, suction cannulas and a spare smaller tube must be readily available at the bedside.
- Cuffed tubes must have pressures checked twice daily.
- Humidification and suctioning needs must be reassessed regularly.
- Timely decannulation should be undertaken in conjunction with a multidisciplinary team.

Although there is a paucity of details regarding this case, it appears that poor humidification and suctioning due to lack of adequate training resulted in mucus plugging. Perhaps simply removing the inner tube might have prevented subsequent hypoxic arrest?

NCEPOD has released its latest report, entitled *On the Right Trach?* The report can be downloaded from at http://www.ncepod.org.uk/.

The following report was received from NHS England. A Patient Safety Alert has been released (NHS/PSA/W/2014/009). The incident described was the trigger incident for a review.

Suction drains in spinal neurosurgery (Ref 183)

A patient with spinal metastases underwent elective surgery to stabilise his spine. During surgery, a small dural tear around a nerve root was sutured and a fascia patch applied. A Redivac drain (Biomet, Bridgend, UK) was inserted near to the wound and attached to a Redivac bottle, with documentation in the notes that the drain should be left to drain passively by gravity. (The Redivac drain is designed as a high vacuum wound drainage system.)

Following surgery, the patient was admitted to the high dependency unit, self-ventilating with a Glasgow coma scale (GCS) score of 15/15. During the night, however, a nurse noticed that the drain was not under suction. The nurse changed the bottle to one that was vacuumed. The patient complained of back pain and requested analgesia. The drain filled rapidly with 400ml of bloodstained fluid before it was clamped to prevent further drainage. The patient deteriorated to GCS 3, with laboured breathing and cardiac arrhythmias. T tonicclonic seizures developed before the patient was intubated and ventilated.

The spinal consultant surgeon was contacted and advised that with the small dural tear it was likely that the fluid drained was cerebrospinal fluid. Brain CT was reported as showing acute intra-axial haemorrhage in the superior cerebellum, with an associated mass effect and tonsillar herniation. Neurosurgeons were contacted and, after discussion, it was decided that the patient would be managed conservatively.

The National Reporting and Learning System database was searched for the keywords 'redivac' and 'spinal'. As a result, 23 incidents were identified. Two further incidents were found, both of which concerned patients with a spinal cerebrospinal fluidleak following spinal surgery. In both cases, it appears a Redivac drain was placed but with the intention of no suction being applied; however, in both cases suction was applied with deleterious effects although the patients came to no lasting harm. These cases are almost identical to the situation in the trigger incident described above.

CORESS comments

Surgical equipment should be used in the manner for which it was designed and licensed. Redivac drains are encountered commonly in all branches of surgery and perform a useful function in aspirating fluid under suction. If a surgeon modifies equipment or uses it in a capacity for which it was not designed, that surgeon potentially assumes liability. While part of good practice, writing instructions in an operation note is no guarantee that they will either be read or adhered to. The WHO surgical safety

'sign-out' check would have covered special management instructions, which should have been communicated to recovery staff and then to ward staff in comprehensive patient handovers.

Further good practice is to label drains (particularly when more than one drain is employed) with a sticky label outlining, for instance, anatomical region drained, specific drain management if unusual, and any method used to secure the drain that might not be immediately apparent and may hinder removal (eg sutures). The Society of British Neurological Surgeons is to produce guidance on the use of drains in spinal neurosurgery.